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ABSTRACT

The purpose of this study was to investigate the present status of computer use and educators' attitudes toward computers in South Korean schools. The questionnaire, mailed to 300 urban and rural elementary, middle, and high schools (response rate: 61 percent) consisted of: (1) demographic data on respondents; (2) computer-using teachers' experiences with computers; (3) availability of hardware and software in schools; (4) school policy on computer education; (5) students' access to computers; (6) factors hindering computer use in schools and factors solving the hindrance problem; (7) evaluation of the results of computer education in schools; and (8) teachers' attitudes toward computers. Overall, South Korean schools have a relatively high level of technology due to the strong governmental support. Computer-using teachers' attitudes tended to be positive and the results of computer education were generally effective. A number of problems were also revealed in the survey that need to be examined further in order to provide insights into problems that occur in computer education and governmental policies. Through thoughtful policy-making and planning, along with the provision of sufficient resources, schools and teachers can expect positive outcomes of computer use in both instruction and administration. (AEF)

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Uses of and Attitudes Toward Computers in Korean Schools

by

Miheon L. Jo

Paper Presented at the Annual Meeting of the American Educational Research Association (AERA), SanFrancisco, April, 1995

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ABSTRACT

Computer uses in instruction and administration are now commonly practiced and becoming increasingly important in educational endeavors. On this point, the success of school computer education depends on how schools implement computers and how educators view the effectiveness of computers. However, little up-to-date information is available on the use of computers and educators' attitudes toward computers in Korea.

The purpose of this research was to investigate the present status of computer use and educators' attitudes toward computers in Korean schools. To serve the purpose, a survey was conducted in November, 1994.

Overall, Korean schools do have relatively a large number of hardware and a large amount of software due to the strong governmental support. Computer-using teachers showed relatively positive impression on the results of computer education. In addition, computer-using teachers' attitudes toward computers tended to be positive.

In contrast with such satisfactory findings, some disappointing results were found, which can also provide valuable insights into the policy-making. Data collected now at the time of the initial use of computers in Korea will be useful for the Ministry of Education to set up a policy to guide computer education.

INTRODUCTION

During the past few years, the use of computers in education showed a remarkable increase in many countries. Educators believe that computers offer tremendous potential for improving educational quality and for revolutionizing educational processes. On the basis of the belief, computer uses in instruction and administration are now commonly practiced, and are becoming increasingly important in educational endeavors. However, as is often the case, the increased use of technology does not necessarily justify itself on sound pedagogical grounds. Like any other technological innovation, computers need to be correctly implemented and properly supported. On this point, the success of computer education depends on how educators use computers and how they view its effectiveness. Thus, it is necessary to collect information about the ways in which computers are being used in schools, and to understand educators' attitudes and opinions toward computers.

In Korea, the Ministry of Education has established a plan to strongly support the computer education in schools. According to the plan, at least 31 computers will be provided to every school in Korea by the end of 1996, and 90 pieces of educational software will be developed each year and provided to school by the end of 1990s.

Regardless of such governmental support, however, computers are still viewed as "new" educational media. Also, up-to-date information is hardly available on the use of computers and educators' attitudes toward computers in Korean schools. In 1989, a research was conducted to examine how schools used computers and how educators perceived computers (Oh, Sohn and Lee, 1989). Since then, no one has conducted a research for such purpose. On this

point, there is a great need to conduct a research on the present status of computer uses and educators' attitudes toward computers in Korean schools.

OBJECTIVES

The purpose of this research was to investigate the present status of computer use and educators' attitudes toward computers in Korean schools. In order to serve the purpose of the research, the following seven objectives were set and research questions were raised for each objective:

1. To survey computer-using teachers' experiences with computers
   - What kind of knowledge do teachers have on computers?
   - What kind of computer-related training have teachers received?
2. To investigate the availability of hardware and software in schools
   - How many computers do schools have?
   - What kind of computers do schools have?
   - What kind of graphic boards do schools have?
   - Where are the computers located?
   - How much software do schools have?
   - What kind of software do schools have?
3. To assess school policy on computer education
   - What is the most important goal for computer use in schools?
   - What kind of support do schools provide for computer education?
   - How often policy-related activities occur in schools?
4. To examine students' access to computers
   - What grade level of students use computers?
   - When can students use computers?
   - How often do students use computers?
   - In what major subject areas are computers used?
   - What are the major curricular topics covered in computer education?
5. To identify factors hindering computer use in schools and factors ameliorating the hindering factors
   - What is the most critical problem hindering schools from using computers?
   - What should be considered first to solve the problem?
6. To sum up computer-using teachers' evaluation on the results of computer education in schools
   - What kind of influence does computer education have on the following aspects:
     teachers' teaching load
     teachers' motivation toward teaching
     teachers' attitudes toward computers
     students' achievement
     students' motivation toward learning

7. To survey computer-using teachers' attitudes toward computers
   - What kind of opinions do teachers have on the following topics:
     usefulness of computers
     need for learning about computers
     influence of computer-related activities on human relationship
     gender equity in computer education

METHODS

The major research method was a survey. The survey questionnaire used in this research was adapted from other related studies (Becker, 1988, 1991; Oh, et al., 1989), and modified in a way to be more appropriate for the purpose of research.

The questionnaire consisted of 8 parts. Each included questions on one of the following topics: demographic data on respondents, computer-using teachers' experiences with computers, availability of hardware and software in schools, school policy on computer education, students' access to computers, factors hindering computer use in schools and those ameliorating the hindrance, evaluation on the results of computer education in schools, and teachers' attitudes toward computers.

The survey was conducted in November, 1994. The questionnaire was mailed to 300 schools. The schools were randomly selected according to the level (i.e., elementary, middle, and high) and the location (i.e., urban and rural). The response rate was about 61%: 182 out of the 300 schools responded to the questionnaire. Survey questionnaire was mailed to the principals of the selected schools, and each principal was asked to select one computer-using teacher in his/her school, who will fill out the survey questionnaire.

RESULTS

1. Demographic Data

Demographic data about schools and teachers in the sample are shown in Tables 1 and 2. Demographic data on schools were gathered in terms of the level, location and type of schools. The total number of schools responded to the survey questionnaire was 182.

Demographic data on teachers were also gathered in terms of gender, age and major subject area. As shown in Table 2, about three fourth of teachers who are responsible for school computer education turned out to be male. Concerning the age of computer-using teachers, the average was 32 ranging from 23 to 48. Teachers' major subject areas were mostly home economics and technology(53%) and science(22%).

<Table 1> Number of Schools in Sample
( ): percent

Classification		Number of Schools
Total		182 (100.0)
School Level	Elementary	75 (41.2)
	Middle	55 (30.2)
	High	52 (28.6)
School Location	Urban	91 (50.0)
	Rural	91 (50.0)
School Type	Public	140 (76.9)
	Private	42 (23.1)

<Table 2> Number of Teachers in Sample
( ): percent

Gender	Number of Teachers
Male	142 (78.0)
Female	40 (22.0)
Total	182 (100.0)

2. Computer-Related Experiences of Teachers

Teachers' Knowledge on Computers

Computer-using teachers were asked to estimate the level of their understanding on 12 topics of knowledge. About most topics, a large proportion of teachers in the sample reported that they understand the topics either "a little" or "well" (See Table 3).

Exceptions were found in "computer-related crime", "use and development of database", and "development of programs". Given the great interest in networked information through telecommunication, more attention needs to be paid to "computer-related crime" and "use and development of database". Concerning teachers' knowledge on "development of programs", although the Ministry of Education encourages teachers' development of software with rewards for the effort, over 50% of teachers reported that they still do not know anything about program development. Training courses need to be organized to teach these topics.

When the responses were compared according to the school level, no big difference was found in teachers' knowledge on computers among the elementary, middle and high schools.

Computer-related Training Experiences

With governmental support, computer-related training courses are provided to teachers. There are three types of training courses with a little variation in the courses: 30 hour-, 60 hour- and 120 hour-training. The 30 hour-training deals with the topics such as needs for computer use, basic concepts of computers and computer-assisted instruction, DOS, wordprocessing, and programming. The 60 hour- and the 120 hour-training courses contain about the topics taught in the 30-hour training at a higher level, and the topics on the uses of other application programs such as spreadsheets and databases.

As shown in Table 4, over 65% of teachers in the sample have taken either 60-hour or 180-hour training courses. However, over 10% of teachers reported that they had no chance to take a computer-related training course, although they were selected as computer-using teachers in their schools.

When teachers' training experiences were compared according to the school level, high school teachers had more opportunities to take 180-hour training courses than other teachers. When the data were reanalyzed according to the location and type of schools, computer-related

training experiences of teachers turned out to be very similar across rural and urban schools, and public and private schools. This indicates that almost equal opportunities for computer training are provided to teachers across the location and the type of schools.

〈Table 3〉 Teachers' Knowledge on Computers

( ): percent

Knowledge on	Answer	Number of Teachers			
		All Cases	School Levels		
			Elementary	Middle	High
Basic Structure and Operating Principles of Computers	Don't Know	9 (5.0)	8 (10.7)	0	1 (1.9)
	Know A Little	116 (63.7)	46 (61.3)	36 (65.5)	34 (65.4)
	Know Well	57 (31.3)	21 (28.0)	19 (34.5)	17 (32.7)
History of Computers	Don't Know	9 (5.0)	4 (5.3)	4 (7.3)	1 (1.9)
	Know A Little	116 (63.7)	50 (66.7)	32 (58.2)	34 (65.4)
	Know Well	57 (31.3)	21 (28.0)	19 (34.5)	17 (32.7)
Social Influence of Computers in Information Society	Don't know	1 (.5)	1 (1.4)	0	0
	Know A Little	97 (53.3)	37 (49.3)	32 (58.2)	28 (53.8)
	Know Well	84 (46.2)	37 (49.3)	23 (41.8)	24 (46.2)
Computer-Related Crime	Don't Know	101 (55.5)	46 (61.3)	33 (60.0)	22 (42.3)
	Know A Little	65 (35.7)	25 (33.4)	16 (29.1)	24 (46.2)
	Know Well	16 (8.8)	4 (5.3)	6 (10.9)	6 (11.5)
Use of Computers for Administrative Work	Don't Know	14 (7.7)	9 (12.0)	3 (5.4)	2 (3.8)
	Know A Little	73 (40.1)	36 (48.0)	15 (27.3)	22 (42.4)
	Know Well	95 (52.2)	30 (40.0)	37 (67.3)	28 (53.8)
Use of Wordprocessor to Write and Edit Text	Don't Know	2 (1.1)	2 (2.7)	0	0
	Know A Little	59 (32.4)	22 (29.3)	18 (32.7)	19 (36.5)
	Know Well	121 (66.5)	51 (68.0)	37 (67.3)	33 (63.5)
Use and Development of Database	Don't Know	71 (39.0)	36 (48.0)	25 (45.4)	10 (19.2)
	Know A Little	94 (51.7)	37 (49.3)	26 (47.3)	31 (59.6)
	Know Well	17 (9.3)	2 (2.7)	4 (7.3)	11 (21.2)
Use of Utility Programs	Don't Know	47 (25.8)	24 (32.0)	15 (27.3)	8 (15.4)
	Know A Little	94 (51.7)	38 (50.7)	27 (49.1)	29 (55.8)
	Know Well	41 (22.5)	13 (17.3)	13 (23.6)	15 (28.8)
Use of Computer Operating Systems	Don't Know	12 (6.6)	7 (9.4)	4 (7.3)	1 (1.9)
	Know A Little	92 (50.5)	37 (49.3)	29 (52.7)	26 (50.0)
	Know Well	78 (42.9)	31 (41.3)	22 (40.0)	25 (48.1)
Use of Educational Software in Classroom	Don't Know	24 (13.2)	7 (9.4)	9 (16.4)	8 (15.4)
	Know A Little	81 (44.5)	34 (45.3)	23 (41.8)	24 (46.1)
	Know Well	77 (42.3)	34 (45.3)	23 (41.8)	20 (38.5)
Evaluation and Selection of Educational Software	Don't Know	47 (25.8)	18 (24.0)	14 (25.5)	15 (28.8)
	Know A Little	109 (59.9)	49 (65.3)	33 (60.0)	27 (51.9)
	Know Well	26 (14.3)	8 (10.7)	8 (14.5)	10 (19.3)
Development of Programs	Don't Know	109 (59.9)	50 (66.7)	32 (58.2)	27 (51.9)
	Know A Little	58 (31.9)	21 (28.0)	19 (34.5)	18 (34.6)
	Know Well	15 (8.2)	4 (5.3)	4 (7.3)	7 (13.5)

<Table 4> Training Experiences

( ): valid percent

Kind of Training	Number of Teachers			
	All Cases	School Levels		
		Elementary	Middle	High
180 hour-training	34 (19.0)	12 (16.2)	8 (14.7)	14 (27.5)
60 hour-training	93 (52.0)	40 (54.0)	28 (51.9)	25 (49.0)
30 hour-training	11 (6.1)	7 (9.5)	3 (5.6)	1 (2.0)
Other	15 (8.4)	7 (9.5)	4 (7.4)	4 (7.8)
None	26 (14.5)	8 (10.8)	11 (20.4)	7 (13.7)
No answer	3	1	1	1
Total	182 (100.0)	75 (100.0)	55 (100.0)	52 (100.0)

3. Availability of Computer Hardware and Software in Schools

Computer Availability

For the instructional use of computers, the Korean government is carrying out a plan for computer education. According to the plan, at least 31 computers are to be provided to every school by the end of 1996. With such governmental support, as shown in Tables 5 and 6, there has been much increase in the average number of computers in each school, and schools now have relatively a large number of computers for instruction.

However, the major kind of computers available in schools is mostly IBM or IBM compatible XT, which does not have a hard diskdrive. Also, there are a large number of students per class in schools: about 60 students in average. On this point, the kind and the number of computers in schools are not satisfatory for active uses of computers in schools.

For administrative use of computers, teachers informed that each school has at least one computer in average. A slight difference was found in the average number of computers for administrative work among schools: high schools tend to have more computers than other schools.

In contrast with these findings, about 6% of the 182 teachers in the sample reported that their schools have no computer to be used for instructional use, and about 7% of schools were without any computer for administrative work.

In addition, schools were compared according to the location and type. For instructional use, urban schools tended to have more computers than rural schools: about 30 computers for urban schools and 22 computers for rural schools in average. Because of the difference in the average number of students per class in urban and rural schools, the difference in the number of computers may not cause less use of computers in schools. Also, when public schools were compared with private schools, private schools tended to have more computers than public schools: the average number of 32 computers for private schools and 27 computers for public schools. For administrative use, no big differrence was found between urban and rural schools and between public and private schools.

<Table 5> Number and Kind of Computers Available in Schools
( ): maximum num. of computers

Kind of Use	Kind of Computers	Average Number of Computers			
		All Cases	School Levels		
			Elementary	Middle	High
Instructional Use	Apple 8bit	1.75 (34)	2.55(34)	1.45(31)	0.90(30)
	IBM XT	18.91 (92)	17.89(92)	19.38(54)	19.87(60)
	IBM AT	2.82 (57)	1.31(21)	4.02(57)	3.75(32)
	IBM 80386	3.87 (41)	3.29(26)	2.49(30)	6.17(41)
	IBM 80486	0.66 (48)	0.03 (1)	0.93(27)	1.31(48)
	Total	28.01 (94)	25.07(94)	28.27(62)	32.00(85)
Administrative Use	Apple 8bit	0.01 (1)	0	0.02(1)	0
	IBM XT	0.05 (2)	0.01 (1)	0.11(1)	0.04(2)
	IBM AT	0.71 (7)	0.49 (4)	0.64(3)	1.12(7)
	IBM 80386	0.83 (5)	0.77 (3)	0.65(3)	1.10(5)
	IBM 80486	0.74 (5)	0.32 (3)	0.85(4)	1.21(5)
	Total	2.34 (11)	1.59 (7)	2.27(7)	3.47(11)

<Table 6> Comparison of the Average Number of Computers between 1989 and 1994

Kind of Use	Average Number of Computers					
	1989			1994		
	Elementary	Middle	High	Elementary	Middle	High
Instructional Use	6.56	8.45	17.33	25.07	28.27	32.00
Administrative Use	0.15	0.45	0.15	1.59	2.27	3.47

Kind of Graphic Board

For both instructional and administrative uses, high schools tend to have a little more color graphic boards than either elementary or middle schools (See Table 7). But, still only a limited number of color computers are available in schools.

<Table 7> Number and Kind of Graphic Board
( ): maximum num. of computers

Kind of Use	Kind of Graphic Board	Average Number of Computers			
		All Cases	School Levels		
			Elementary	Middle	High
Instructional Use	Black/White	23.12 (92)	20.00 (92)	26.16 (61)	24.38 (80)
	Color	3.59 (62)	3.41 (26)	1.98 (31)	5.56 (62)
Administrative Use	Black/White	0.86 (7)	0.71 (6)	0.78 (3)	1.17 (7)
	Color	1.42 (7)	0.88 (4)	1.40 (4)	2.21 (7)

Computer Location

Most computers are located in the computer lab., as indicated in Table 8. Also, it is worth pointing out the following two kinds of findings: for instructional use, unlike other schools, elementary schools have an average number of one computer in a classroom: and for administrative use, schools have an average of one computer in the office of school affairs. Some teachers reported a language lab. and a counseling room as other computer locations.

<Table 8> Number of Computers According to Location
( ): maximum num. of computers

Location	Average Number of Computers			
	All Cases	School Levels		
		Elementary	Middle	High
Computer Lab.	25.96 (95)	22.49 (95)	26.64 (55)	30.25 (83)
Library	0.04 (2)	0.00	0.07 (1)	0.08 (2)
Resource Room	0.12 (4)	0.08 (4)	0.02 (1)	0.29 (3)
Science Lab.	0.21 (6)	0.35 (6)	0.05 (1)	0.17 (3)
Office of School Affairs	1.22 (6)	1.05 (5)	0.98 (5)	1.71 (6)
Principal's Office	0.06 (1)	0.05 (1)	0.07 (1)	0.06 (1)
Office of Financial Affairs	0.84 (3)	0.44 (2)	1.04 (2)	1.19 (3)
Classroom	0.59 (3)	1.39 (3)	0.05 (3)	0
Other	0.25 (7)	0.12 (3)	0.27 (6)	0.40 (7)

Software Availability

Since 1989, there has been a big increase in the amount of instructional software available in schools (See Table 9). This is due to the governmental policy to support the development and distribution of educational software: a large amount of software is developed every year and distributed to schools by the end of 1990s. On the basis of such policy, 497 pieces of educational software have been developed by the end of 1994 and distributed to schools. However, regardless of such increase, there are still many schools that do not have any software to use: 30% of teachers in the sample reported that their schools do not have any software for instruction.

Unlike the software availability for instructional use, in the case of software for administrative use, a surprising result was found: there was a significant decrease in the amount of software available in elementary schools. In addition, 14% of schools in the sample reported that they do not have any software for administrative work.

When the software availability was compared according to the school level, a great discrepancy was found between elementary schools and other schools in the average amount of instructional software.

In addition, a comparison was made between schools across different locations and types. For instructional software, when the average amount of software was compared between urban and rural schools, it was found that rural schools have much more software than urabn schools: about 74 pieces in average for rural schools and 45 for urban schools. When public

schools were compared with private schools, it was found that public schools have more software than private schools: about 63 pieces for public schools and 34 for private schools. For administrative use, it was reported that an average number of 4 or 5 pieces of software are available in schools across different locations and types.

Concerning the kind of software for instructional use, software for mathematics and science took the majority. For administrative use, unlike other types of software, schools have one or two pieces of word processing software.

〈Table 9〉 Amount and Kind of Software Avaiable in Schools

Kind of Use	Kind of Software	Average Amount of Software						
		All Cases (1994)	School Levels					
			1989			1994		
			Elem.	Middle	High	Elem.	Middle	High
Instructional Use	Mathematics	14.19	0.86	0.25	0.23	19.99	11.98	8.15
	Science	13.68	0.50	0.18	0.19	16.41	13.40	10.02
	Home Economics/ Technology	9.15	0.02	0.08	0.69	10.11	9.42	7.50
	Korean	2.69	0.06	0.04	0.02	8.92	1.62	2.40
	Foreign Languages	2.49	0.04	0.26	0.12	0.09	6.04	2.21
	Social Sciences	5.05	0.11	0.01	0.01	8.48	2.87	2.40
	Art/Music	0.98	0.06	0.03	0.05	1.25	0.87	0.69
	Extracurriculum	7.92	0	0	0	9.93	6.80	6.19
	Other	0.41	0.25	0.22	0.49	0.52	0.35	0.33
	Total	56.56	1.90	1.07	1.80	75.70	53.35	39.89
Administrative Use	Grading	0.98	0.61	1.19	2.01	1.05	1.00	0.85
	Time Scheduling	0.51	0	0	0	0.29	0.60	0.71
	Budgeting	0.71	0.51	0.36	0.85	0.75	0.60	0.77
	Management of Books /Learning Materials	0.33	2.86	0.01	0.09	0.31	0.18	0.52
	Management of Instructional Tools	0.46	0	0	0	0.51	0.47	0.38
	Personnel Management	0.09	0.08	0.02	0.10	0.12	0.05	0.08
	Word Processor	1.80	3.65	0.49	0.94	2.36	1.33	1.48
	Other	0.25	3.44	0.17	0.47	0.24	0.36	0.13
	Total	5.13	11.15	2.24	4.46	5.63	4.59	4.92

4. School Policy on Computer Education

The Most Important Goal for Computer Use in Schools

About half of teachers in the sample reported "teaching students about computers" as the most important goal for computer use in their schools (See Table 10).

A notable increse was found in schools, which have no specific goal for their school computer use: more than twice as many schools as those in the 1989 research reported "no specific goal" in the present research. Because the functions of computers used in schools

are very limited, schools seem to face difficulty in using computers. The increase may be due to such difficulty.

On the other hand, a significant increase was found in schools, which emphasize the use of computers for administrative work. Especially, this was apparent in high schools.

<Table 10> Major Goal for Computer Use in Schools ( ): valid percent

Goal	Number of Schools				
	All Cases		School Levels		
	1989	1994	Elementary	Middle	High
To Teach Students about Computers	92 (69.2)	91 (50.0)	36 (48.0)	30 (54.5)	25 (48.1)
To Use Computers in Classes in Regular Curriculum	18 (13.5)	19 (10.4)	11 (14.7)	3 (5.5)	5 (9.6)
To Conduct School Administrative Work	4 (3.0)	30 (16.5)	8 (10.7)	7 (12.7)	15 (28.8)
Because Government Provided Computers (No Specific Goal)	14 (10.5)	42 (23.1)	20 (26.6)	15 (27.3)	7 (13.5)
No Answer	5 (3.8)	0	0	0	0
Total	133 (100.0)	182 (100.0)	75 (100.0)	55 (100.0)	52 (100.0)

Administrative Support from Schools

As shown in Table 11, 34% of teachers in the sample indicated "purchasing computers and computer-related facilities" as the most important administrative support from schools. The next most frequently provided support is "providing computer training courses"(21.6%), followed by "equipping computer laboratory"(18%).

When responses were compared according to the school level, in high school almost twice as many teachers as those in elementary and middle schools reported "the purchase of computers and computer-related facilities" as the primary support. This may be because the functions of computers available in schools are very limited in performing the computer-related activities needed in high schools, and there is a great need to equip other related facilities such as LAN, OHP LCD palette and printers. In this category, a difference was also found between the 1989 research and the 1994 research. It is also noticeable that twice as many schools as those in the 1989 research reported "equipping a computer laboratory" as the major administrative support in the 1994 research.

<Table 11> Administrative Support

( ): valid percent

Kind of Support	Average Number of Schools				
	All Cases		School Levels		
	1989	1994	Elementary	Middle	High
Providing Training Courses on Computer Education	38 (28.6)	36 (21.6)	19 (26.8)	12 (23.5)	5 (11.1)
Purchasing Computers and Computer-related Facilities	23 (17.3)	57 (34.0)	20 (28.2)	14 (27.5)	23 (51.1)
Purchasing Software	5 (3.8)	16 (9.6)	9 (12.7)	4 (7.8)	3 (6.7)
Assigning a Teacher to Be Responsible for Computer Ed.	12 (9.0)	10 (6.0)	7 (9.9)	2 (3.9)	1 (2.2)
Employing an Assistant for Computer Ed.	1 (0.8)	3 (1.8)	1 (1.4)	2 (3.9)	0
Equipping a Computer Laboratory	12 (9.0)	30 (18.0)	10 (14.0)	12 (23.5)	8 (17.8)
Purchasing Computer-related Facilities for Computer Lab.	3 (2.3)	4 (2.4)	3 (4.2)	0	1 (2.2)
Purchasing Safety Equipment for Computer Lab.	0 (0.0)	4 (2.4)	1 (1.4)	2 (3.9)	1 (2.2)
Purchasing Teaching/ Learning Materials for Computer Ed.	2 (1.5)	7 (4.2)	1 (1.4)	3 (6.0)	3 (6.7)
Other	5 (3.7)	0	0	0	0
No Answer	0 (0.0)	15	4	4	7
Total	133 (100.0)	182 (100.0)	75 (100.0)	55 (100.0)	52 (100.0)

Policy-related Activities on Computer Education

Teachers were asked about the frequency and the kind of activities taking place in schools. Their responses are summarized in Table 12.

Concerning parents' support, most teachers reported that their schools have never received such support. Especially, all the high school teachers in the sample informed that their schools have never received any support from parents. This may be because of the strong gorvernmental support.

Concerning principals' encouragement for computer use, most teachers reported that their schools do receive such support. However, it is worth mentioning that about one fourth of high schools in the sample have never received such support from their principals. It may be because the major interest of high school principals is in the college entrance examination over anything else.

For other types of activities (i.e., formation of an interest group, periodic evaluation on computer education, reduction of teaching load, purchase of related materials), in contrast with the 1989 research, the 1994 research showed either slight or big increases in the answer, "never". Especially, it is surprising to find out the fact that over 96% of the schools in the sample had never reduced teaching load of teachers who are responsible for computer uses in schools. This might happen because of the disappointment of teachers and

school administrators on the present status and problems of computer education. On this point, there is a great need for administrative support, that can provide strong incentives toward computer use in schools.

<Table 12> Policy-related Activities

( ): valid percent

Activity	Answer	Number of Schools				
		All Cases		School Levels		
		1989	1994	Elementary	Middle	High
Support from Parents	Never	97 (72.9)	162 (91.0)	62 (83.8)	50 (92.6)	50 (100.0)
	Sometimes	30 (22.6)	13 (7.3)	9 (12.2)	4 (7.4)	0
	Often	4 (3.0)	3 (1.7)	3 (4.0)	0	0
	No Answer	2 (1.5)	4	1	1	2
Principals' Encouragement for Teachers and Students to Use Computers	Never	6 (4.5)	28 (15.6)	6 (8.2)	9 (16.7)	13 (25.5)
	Sometimes	63 (47.4)	88 (49.2)	36 (48.6)	27 (50.0)	25 (49.0)
	Often	63 (47.4)	63 (35.2)	32 (43.2)	18 (33.3)	13 (25.5)
	No Answer	1 (0.7)	3	1	1	1
Formation of Teachers' Interest Group to Share Information or to Provide Self-training on Computer Use	Never	25 (18.8)	47 (26.4)	19 (26.0)	15 (27.8)	13 (25.5)
	Sometimes	86 (64.7)	110 (61.8)	43 (58.9)	33 (61.1)	34 (66.7)
	Often	20 (15.0)	21 (11.8)	11 (15.1)	6 (11.1)	4 (7.8)
	No Answer	2 (1.5)	4	2	1	1
Periodic Evaluation on Computer Education and Use	Never	40 (30.1)	100 (56.2)	40 (54.8)	33 (61.1)	27 (52.9)
	Sometimes	74 (55.6)	73 (41.0)	31 (42.5)	20 (37.0)	22 (43.1)
	Often	14 (10.5)	5 (2.8)	2 (2.7)	1 (1.9)	2 (3.9)
	No Answer	5 (3.8)	4	2	1	1
Reduction of Teaching Load for Teachers Responsible for Computer Education	Never	94 (70.9)	167 (96.5)	68 (98.6)	51 (96.2)	48 (94.1)
	Sometimes	30 (22.6)	5 (2.9)	1 (1.4)	2 (3.8)	2 (3.9)
	Often	6 (4.5)	1 (.6)	0	0	1 (2.0)
	No Answer	4 (3.0)	9	6	2	1
Purchase of Books or Journals on Computer Education	Never	42 (31.6)	104 (58.8)	50 (69.4)	33 (61.1)	21 (41.2)
	Sometimes	78 (58.6)	63 (35.6)	20 (27.8)	20 (37.0)	23 (45.1)
	Often	9 (6.8)	10 (5.6)	2 (2.8)	1 (1.9)	7 (13.7)
	No Answer	4 (3.0)	5	3	1	1

5. Students' Access to Computers

Major Grade Level Using Computers in Schools

Table 13 summarizes the answers of teachers regarding the major grade level of computer users. 77% of teachers answered that their schools provide opportunities for computer education to students at specific grade levels.

For elementary schools, about 60% of teachers in the sample reported that the 4th, 5th and 6th graders are the primary users of computers. This is consistent with the government policy that recommends elementary schools to provide computer education to 4~6 graders. For the other graders, there seems to be almost no chance to use computers.

For middle schools, among the schools in which specific graders can use computers, 36% reported the 7th graders as the major users of computers, and 22% pointed out the 7th and 8th graders as primary users of computers. It seems that 9th graders have almost no chance to use computers.

For high schools, the grade levels using computers varied a lot. It is, however, noticeable that the 12th graders were less likely to use computers. It may be because of the time schedule tightly fixed for the preparation for college entrance examination.

<Table 13> Major Grade Level Using Computers in Schools
( ): valid percent

Grade Level	Number of Schools			
	All Cases	School Levels		
		Elementary	Middle	High
Every Level	37 (22.8)	10 (13.9)	11 (23.4)	16 (37.2)
Specific Level	125 (77.2)	62 (86.1)	36 (76.6)	27 (62.8)
No Answer	20	3	8	9
Total	182 (100.0)	75 (100.0)	55 (100.0)	52 (100.0)

Available Time to Use Computers in Computer Laboratory

Teachers were asked to check all the time period in which the computer laboratory is available. Those who did not answer to this question reported that their schools do not have many computers to use, and thus no attempt has been made for computer education.

Among the rest of schools, the most common time to use computers is during the extracurricular hours with the exception of high schools (See Table 14). For high schools, this might happen because of their emphasis on the college entrance examination.

For computer education class, it is the governmental policy to have each school decide whether they select computer education as a part of regular curriculum. Because of this policy, about half of the schools in the sample reported that they use the computer lab. during the class hour of computer education, and the other half not using the computer lab. during the class hour.

Concerning the use of computers in regular classes, it seems that schools should be more encouraged to use computer-assisted instructional programs and other application programs in their regular classes as tools for teaching and learning.

Among the teachers who reported that their schools use computers during other time, 92% reported lunch hour.

Average Hours of Students' Computer Use

Table 15 summarizes the average hours of students' computer use. About 40% of teachers informed that students in their schools can use computers for 1 or 2 hours per week. In contrast, about 19% of teachers reported less than 1 or 2 hours per semester. The conflict between the large number of students and the limited amount of computers in schools seems to hinder schools from using computers more often than now. When schools were compared according

to the level, it seemed that elementary schools use computers relatively more often than secondary schools.

<Table 14> Available Time to Use Computers in Computer Laboratory
( ): valid percent

Time	Answer	Number of Schools			
		All Cases	School Levels		
			Elementary	Middle	High
Extracurricular Hours	Use	129 (77.7)	55 (76.4)	40 (83.3)	12 (26.1)
	Not Use	37 (22.3)	17 (23.6)	8 (16.7)	34 (73.9)
	No Answer	16	3	7	6
Computer Education Class	Use	98 (59.0)	46 (63.9)	28 (58.3)	24 (52.2)
	Not Use	68 (41.0)	26 (36.1)	20 (41.7)	22 (47.8)
	No Answer	16	3	7	6
Recular Class	Use	101 (60.8)	48 (66.7)	29 (60.4)	24 (52.2)
	Not Use	65 (39.2)	24 (33.3)	19 (39.6)	22 (47.8)
	No Answer	16	3	7	6
Before School Hours	Use	13 (7.8)	8 (11.1)	2 (4.2)	3 (93.5)
	Not Use	153 (92.2)	64 (88.9)	46 (95.8)	43 (93.5)
	No Answer	16	3	7	6
After School Hours	Use	76 (45.8)	42 (58.3)	21 (43.8)	13 (28.3)
	Not Use	90 (54.2)	30 (41.7)	27 (56.2)	33 (71.7)
	No Answer	16	3	7	6
Other	Use	12 (7.2)	5 (6.9)	3 (6.3)	4 (8.7)
	Not Use	154 (92.8)	67 (93.1)	45 (93.7)	42 (91.3)
	No Answer	16	3	7	6

<Table 15> Average Hours of Students' Computer Use
( ): valid percent

Average Hours of Use	Number of Schools			
	All Cases	School Levels		
		Elementary	Middle	High
More than 2 hours per week	45 (26.5)	17 (23.3)	10 (20.8)	18 (36.7)
1 or 2 hours per week	67 (39.4)	34 (46.6)	16 (33.3)	17 (34.7)
1 or 2 hours per month	25 (14.7)	14 (19.1)	10 (20.8)	1 (2.0)
1 or 2 hours per semester	20 (11.8)	4 (5.5)	9 (18.8)	7 (14.3)
None	13 (7.6)	4 (5.5)	3 (6.3)	6 (12.3)
Other	0	0	0	0
No Answer	12	2	7	3
Total	182 (100.0)	75 (100.0)	55 (100.0)	52 (100.0)

Major Subject Area Using Computers

Teachers were asked about the subject area in which computers are used the most frequently. According to their responses, the most common subject area in which computers are used is home economics and technology (See Table 16). The next most frequently used subject areas are mathematics and science.

It is noticeable that elementary schools use computers most often in mathematics, while almost none of middle and high schools emphasize mathematics as the major subject area.

<Table 16> Major Subject Area Using Computers

Subject Area	Number of Schools			
	All Cases	School Levels		
		Elementary	Middle	High
Mathematics	31 (19.6)	30 (44.2)	0	1 (2.2)
Science	25 (15.8)	10 (14.7)	9 (20.0)	6 (13.3)
Home Economics/ Technology	93 (58.9)	24 (35.3)	34 (75.6)	35 (77.8)
Korean	0	0	0	0
Foreign Languages	0	0	0	0
Social Sciences	3 (1.9)	2 (2.9)	1 (2.2)	0
Art/Music	0	0	0	0
Extracurriculum	5 (3.2)	2 (2.9)	0	3 (6.7)
Other	1 (.6)	0	1 (2.2)	0
No Answer	24	7	10	7
Total	182 (100.0)	75(100.0)	55 (100.0)	52 (100.0)

Major Curricular Topics Covered in Computer Education

As shown in Table 17, teachers in the sample reported the most frequestly covered topics in computer education as "using DOS"(24.5%), "dealing with computers"(20.4%) and "using CAI programs"(20.4%). It is also worth indicating that relatively less emphasis is given on programming-related topics and no emphasis on flowcharting. This might happen due to the change in computer-related curriculum.

A surprising result was found in the topic, "dealing with computers". Although the topic is about basic knowledge of computers, about 21% of high school teachers reported it as the most important curricular topic in computer education. This might happen because of the lack of opportunities for students to learn about computers.

Concerning the use of CAI programs, a large proportion of elementary and middle school teachers reported their interest in the topic. In contrast, at the high school level, almost no school informed "using CAI programs" as the most important topic of computer education.

<Table 17> The Most Important Curricular Topics Covered in Computer Education
( ): valid percent

Topic	Number of Schools			
	All Cases	Schoos Levels		
		Elementary	Middle	High
Programming Languages and Programming	20 (12.0)	6 (8.2)	9 (18.8)	5 (10.6)
Dealing with Computers	34 (20.4)	18 (25.0)	6 (12.5)	10 (21.3)
History, Structure, Operating Principles of Computers	5 (3.0)	2 (2.8)	1 (2.1)	2 (4.3)
Flowcharting	0	0	0	0
Using DOS	41 (24.5)	13 (18.1)	13 (27.1)	15 (31.9)
Using Application Programs	19 (11.3)	4 (5.6)	3 (6.3)	12 (25.6)
Keyboarding	12 (7.2)	9 (12.5)	2 (4.1)	1 (2.1)
Using CAI Programs	34 (20.4)	19 (26.4)	14 (29.1)	1 (2.1)
Social Influence of Computers	1 (.6)	1 (1.4)	0	0
Computer-related Crime	0	0	0	0
Other	1 (.6)	0	0	1 (2.1)
No Answer	15	3	7	5
Total	182 (100.0)	75 (100.0)	55 (100.0)	52 (100.0)

6. Factors Hindering Computer Use/Factors Ameliorating the Hindrance

Hindering and Ameliorating Factors on Computer Use for Instruction

Teachers were asked about the most critical factor hindering schools from using the computer for instruction, and the most important factor ameliorating the hindrance. The responses are summarized in Tables 18 and 19.

Concerning the problem, 20% of the teachers believed that the major problem is the lack of qualified teachers. Although "the lack of qualified teachers" was reported as the most critical problem, only 1.2% pointed out the lack of opportunities for computer training as the problem. The next most frequent responses were the lack of computers(14.2%) and the limited functions and memeory of the computers(14.2%).

When teachers' answers were compared according to the school level, a discrepancy was found between high schools and other schools. High school teachers tended to view school policy and change of time schedule to be very important. In contrast, while elementary and middle school teachers attatched importance to the need for qualified teachers, high school teachers took this issue relatively less important.

Concerning the most important factor to solve the problem hindering the school computer use for instruction, overall, teachers viewed all the listed factors to be important although there were some differences found in the frequencey of answers to some factors.

The most frequently indicated factors (i.e., "not having enough compouters to use" and "not having computer hardware with enough memory and functions") were related to the purchase of computer hardware. This finding was similar to all the schools across different levels. More high school teachers viewed school policy to be important than did teachers in elementary and middle schools. More elementary schoool teachers viewed the change of time

scheduling as a crucial factor to solve the problem in school computer use than did teachers in other schools. This may be due to the teaching load of teachers in elementary schools, who should teach almost all the subject areas.

<Table 18> The Most Important Problem in Using Computers for Instruction

( ): valid percent

Problems in Using Computers	Number of Schools			
	All Cases	School Levels		
		Elementary	Middle	High
Not Having Enough Computers to Use	24 (14.2)	11 (16.0)	7 (13.6)	6 (12.4)
Not Having Enough Computer-related Facilities to Use	5 (3.0)	2 (2.9)	0	3 (6.3)
Not Having Computer Hardware with Enough Memory and Functions	24 (14.2)	9 (13.0)	9 (17.3)	6 (12.4)
Having Difficulties in Maintaining Computers and Related Facilities	3 (1.8)	1 (1.4)	2 (3.8)	0
Not Having Computer Laboratory	10 (5.9)	3 (4.3)	4 (7.7)	3 (6.3)
Not Having Enough Instructional Software to Use	18 (10.7)	10 (14.6)	5 (9.6)	3 (6.3)
Not Having Enough Understanding on the Complexity of Software to Use	3 (1.8)	0	2 (3.8)	1 (2.1)
Not Having Enough Data or Information Needed in Using Computers	2 (1.2)	1 (1.4)	1 (1.9)	0
Not Having Enough Qualified Teachers in Teaching About/With Computers	35 (20.6)	21 (30.5)	10 (19.3)	4 (8.3)
Not Having Enough Opportunities to Take Computer Training Courses	2 (1.2)	1 (1.4)	0	1 (2.1)
Not Having Enough Interest in Using Computers	12 (7.1)	3 (4.3)	6 (11.5)	3 (6.3)
Having More Teaching Load than Before	9 (5.3)	3 (4.3)	3 (5.8)	3 (6.3)
Not Having Enough Administrative Support from Schools	1 (.6)	0	0	1 (2.1)
Having Difficulties in Satisfying Present Educational Policy of Schools	8 (4.7)	0	2 (3.8)	6 (12.5)
Having No Time to Integrate Computer Education into Curriculum	13 (7.7)	4 (5.9)	1 (1.9)	8 (16.7)
Having Students' Negative Attitudes toward Computers	0	0	0	0
Other	0	0	0	0
No Answer	13	6	3	4
Total	182 (100.0)	75 (100.0)	55 (100.0)	52 (100.0)

<Table 19> The Most Important Factor Ameliorating the Problem in Computer Use for Instruction ( ): valid percent

Factors Ameliorating Problems in Computer Use	Number of Schools			
	All Cases	School Levels		
		Elementary	Middle	High
Not Having Enough Computers to Use	20 (11.6)	10 (13.9)	4 (7.5)	6 (12.8)
Not Having Enough Computer-related Facilities to Use	10 (5.8)	4 (5.6)	3 (5.7)	3 (6.4)
Not Having Computer Hardware with Enough Memory and Functions	34 (19.9)	14 (19.4)	14 (26.3)	6 (12.8)
Having Difficulties in Maintaining Computers and Related Facilities	4 (2.3)	1 (1.4)	2 (3.8)	1 (2.0)
Not Having Computer Laboratory	5 (2.9)	1 (1.4)	2 (3.8)	2 (4.3)
Not Having Enough Instructional Software to Use	16 (9.3)	7 (9.7)	6 (11.3)	3 (6.4)
Not Having Enough Understanding on the Complexity of Software to Use	3 (1.7)	1 (1.4)	1 (1.9)	1 (2.0)
Not Having Enough Data or Information Needed in Using Computers	4 (2.3)	0	1 (1.9)	3 (6.4)
Not Having Enough Qualified Teachers in Teaching about/with Computers	15 (8.7)	6 (8.3)	5 (9.4)	4 (8.5)
Not Having Enough Opportunities to Take Computer Training Courses	15 (8.7)	7 (9.7)	3 (5.7)	5 (10.6)
Not Having Enough Interest in Using Computers	4 (2.3)	2 (2.8)	2 (3.8)	0
Having More Teaching Load than Before	6 (3.5)	2 (2.8)	2 (3.8)	2 (4.3)
Not Having Enough Administrative Support from Schools	12 (7.0)	7 (9.7)	3 (5.7)	2 (4.3)
Having Difficulties in Satisfying Present Educational Policy of Schools	7 (4.1)	0	1 (1.9)	6 (12.8)
Having No Time to Integrate Computer Education into Curriculum	17 (9.9)	10 (13.9)	4 (7.5)	3 (6.4)
Having Students' Negative Attitudes toward Computers	0	0	0	0
Other	0	0	0	0
No Answer	10	3	2	5
Total	182(100.0)	75 (100.0)	55 (100.0)	52 (100.0)

Hindering and Ameliorating Factors on Computer Use for Administration

Like the above questions on the use of computers for instruction, teachers were first asked about the most critical factor hindering schools from using computers for administration. The responses are summarized in Table 20. Concerning the problem of computer use, about 26% of teachers believed that the major problem is the lack of qualified teachers. The next most frequently answered reasons were the lack of computer hardware and software.

When schools were compared according to the level, a discrepancy was found between high schools and other schools. High school teachers tended to view the purchase of computer-related facilities to be important more than did other teachers. This may be due to the need for the purchase of LAN, printers, OHP, OHP LCD palette, etc. in teaching advanced level of knowledge on computers.

In addition to the above question, teachers were also asked about the most important factor that should be considered to solve the problem hindering the school computer use for administration. The responses are summarized in Table 21. Overall, teachers viewed all the listed factors to be important although there were some differences found in the frequency of answers on some factors.

The most frequently indicated factor was the need for qualified teachers. The next most frequently cited factors were the purchase of hardware and software. It is worth noticing that more high school teachers viewed administrative support from schools and administrators' understanding on computer education to be important than did teachers in elementary and middle schools.

<Table 20> The Most Important Problem in Using Computers for Administration
( ): valid percent

Problems in Using Computers	Number of Schools			
	All Cases	School Levels		
		Elementary	Middle	High
Not Having Enough Computers to Use	36 (21.2)	15 (20.8)	14 (27.5)	7 (14.8)
Not Having Enough Computer-related Facilities to Use	9 (5.3)	1 (1.4)	2 (3.9)	6 (12.8)
Not Having Computer Hardware with Enough Memory and Functions	11 (6.5)	2 (2.8)	5 (9.8)	4 (8.5)
Having Difficulties in Maintaining Computers and Related Facilities	1 (.6)	1 (1.4)	0	0
Not having Enough Software to Use	25 (14.7)	12 (16.7)	7 (13.7)	6 (12.8)
Not Having Enough Understanding on the Complexity of Software to Use	2 (1.2)	2 (2.8)	0	0
Not Having Enough Data or Information Needed in Using Computers	7 (4.1)	5 (6.9)	0	2 (4.3)
Not Having Enough Qualified Teachers in Using Computers	44 (25.8)	20 (27.8)	15 (29.3)	9 (19.0)
Not Having Enough Opportunities to Take Computer Training Courses	6 (3.5)	4 (5.6)	0	2 (4.3)
Not Having Enough Interest in Using Computers	6 (3.5)	2 (2.8)	1 (2.0)	3 (6.4)
Having More Working Load Than Before	8 (4.7)	3 (4.1)	3 (5.9)	2 (4.3)
Having Negative Attitudes Toward Computers	1 (.6)	0	1 (2.0)	0
Not Having Enough Time to Use Computers	4 (2.4)	3 (4.1)	1 (2.0)	0
Having Difficulties in Matching Administrative Work with Computers	1 (.6)	1 (1.4)	0	0
Not Having Enough Administrative Support from Schools	5 (2.9)	1 (1.4)	2 (3.9)	2 (4.3)
Not Having Enough Understanding on Computer Use by Administrators	4 (2.4)	0	0	4 (8.5)
Other	0	0	0	0
No Answer	12	3	4	5
Total	182 (100.0)	75 (100.0)	55 (100.0)	52 (100.0)

<Table 21> The Most Important Factor Ameliorating the Problem in Computer Use for Administration ( ): Valid percent

Factors Ameliorating Problems in Computer Use	Number of Schools			
	All Cases	School Levels		
		Elementary	Middle	High
Not Having Enough Computers to Use	22 (12.9)	10 (14.3)	8 (14.7)	4 (8.5)
Not Having Enough Computer-related Facilities to Use	16 (9.4)	3 (4.3)	5 (9.3)	8 (17.0)
Not Having Computer Hardware with Enough Memory and Functions	20 (11.7)	10 (14.3)	7 (13.0)	3 (6.4)
Having Difficulties in Maintaining Computers and Related Facilities	3 (1.8)	1 (1.4)	2 (3.7)	0
Not having Enough Software to Use	19 (11.1)	10 (14.3)	5 (9.3)	4 (8.5)
Not Having Enough Understanding on the Complexity of Software to Use	4 (2.3)	2 (2.9)	1 (1.9)	1 (2.1)
Not Having Enough Data or Information Needed in Using Computers	2 (1.2)	0	1 (1.9)	1 (2.1)
Not Having Enough Qualified Teachers in Using Computers	26 (15.1)	13 (18.5)	7 (13.0)	6 (12.8)
Not Having Enough Opportunities to Take Computer Training Courses	10 (5.8)	4 (5.7)	3 (5.5)	3 (6.4)
Not Having Enough Interest in Using Computers	5 (2.9)	1 (1.4)	2 (3.7)	2 (4.3)
Having More Working Load Than Before	8 (4.7)	3 (4.3)	3 (5.5)	2 (4.3)
Having Negative Attitudes Toward Computers	2 (1.2)	0	1 (1.9)	1 (2.1)
Not Having Enough Time to Use Computers	4 (2.3)	2 (2.9)	2 (3.7)	0
Having Difficulties in Matching Administrative Work with Computers	2 (1.2)	1 (1.4)	0	1 (2.1)
Not Having Enough Administrative Support from Schools	16 (9.4)	6 (8.6)	4 (7.4)	6 (12.8)
Not Having Enough Understanding on Computer Use by Administrators	12 (7.0)	4 (5.7)	3 (5.5)	5 (10.6)
Other	0	0	0	0
No Answer	11	5	1	5
Total	182 (100.0)	75 (100.0)	55 (100.0)	52 (100.0)

7. Evaluation on The Results of Computer Education

Teachers were asked to evaluate the results of computer education in five aspects. The answers are summarized in Table 22. The teachers whose schools do not have any computer or do not use computers often did not answer.

Concerning the influence on teachers' teaching load, most teachers reported that the load has been increased either very much or a little. Especially more middle school teachers reported a significant increase of teaching load than did teachers in elementary and high schools.

Concerning changes in teachers' motivation and attitudes toward teaching, most teachers evaluated as being "enhanced a little". Although every teacher may agree with the usefulness of computers, they may feel difficulty in using computers because of the limited number of

computers compared to the large number of students, and because of the increase in teaching load.

About the influence of computer use on students' achievement, many teachers evaluated as being "enhanced a little". More systematic uses of computers than now are needed, followed by detailed evaluation. About the changes in students' motivation toward learning, most teachers answered as either "being enhanced much" or "being enhanced a little".

Overall, the results of computer education were positively rated at all levels of schools.

<Table 22> Evaluation on the Results of Computer Education

( ): valid percent

Influence on	Answer	Number of Schools			
		All Cases	School Levels		
			Elementary	Middle	High
Teachers' Teaching Load	Increased Much	63 (36.8)	26 (34.6)	24 (49.0)	13 (27.7)
	Increased A Little	74 (43.4)	30 (40.0)	20 (40.8)	24 (51.1)
	No Influence	18 (10.5)	8 (10.7)	4 (8.2)	6 (12.8)
	Decreased A Little	10 (5.8)	6 (8.0)	1 (2.0)	3 (6.3)
	Decreased Much	6 (3.5)	5 (6.7)	0	1 (2.1)
	No Answer	11	0	6	5
Teachers' Motivation toward Teaching	Enhanced Much	41 (24.3)	16 (21.5)	12 (24.5)	13 (28.3)
	Enhanced A Little	106 (62.7)	50 (67.6)	27 (55.1)	29 (63.0)
	No Influence	13 (7.7)	1 (1.4)	8 (16.3)	4 (8.7)
	Declined A Little	7 (4.1)	5 (6.8)	2 (4.1)	0
	Declined Much	2 (1.2)	2 (2.7)	0	0
	No Answer	13	1	6	6
Teachers' Attitudes toward Computers	Enhanced Much	61 (36.1)	28 (37.3)	15 (32.0)	18 (38.3)
	Enhanced A Little	95 (56.2)	44 (58.7)	26 (55.3)	25 (53.2)
	No Influence	5 (3.0)	3 (4.0)	1 (2.1)	1 (2.1)
	Declined A Little	7 (4.1)	0	4 (8.5)	3 (6.4)
	Declined Much	1 (.6)	0	1 (2.1)	0
	No Answer	13	0	8	5
Students' Achievement	Enhanced Much	35 (21.0)	18 (24.3)	7 (15.2)	10 (21.8)
	Enhanced A Little	105 (63.3)	49 (66.2)	27 (58.7)	29 (63.0)
	No Influence	21 (12.7)	6 (8.1)	9 (19.6)	6 (13.0)
	Declined A Little	5 (3.0)	1 (1.4)	3 (6.5)	1 (2.2)
	Declined Much	0	0	0	0
	No Answer	16	0	9	6
Students' Motivation toward Learning	Enhanced Much	84 (50.3)	44 (58.7)	19 (41.3)	21 (45.7)
	Enhanced A Little	79 (47.3)	29 (38.6)	27 (58.7)	23 (50.0)
	No Influence	4 (2.4)	2 (2.7)	0	2 (4.3)
	Declined A Little	0	0	0	0
	Declined Much	0	0	0	0
	No Answer	15	0	9	9

8. Computer-using Teachers' Attitudes Toward Computers

In order to assess teachers' attitudes toward computers, 7 questions were raised. The questions can be rearranged into four categories: usefulness of computers, need for acquiring computer-related experiences, influence of computer use on inhuman relationship, and gender equity. The summary of the responses is presented in Table 23.

About the usefulness of computers, two questions were raised on the usefulness of computers in enhancing educational quality and usefulness of computers limited to only several subject areas. Overall, teachers showed positive attitudes toward the usefulness, and viewed computers to be usable in many areas.

<Table 23> Teachers' Attitudes Toward Computers ( ): valid percent

Question	Answer	Number of Teachers			
		All Cases	Level of Schools		
			Elementary	Middle	High
Computers are useful tools that can enhance the quality of school education.	Strongly Agree	90 (49.5)	35 (46.7)	25 (45.5)	30 (57.7)
	Slightly Agree	90 (49.5)	39 (52.0)	29 (52.7)	22 (42.3)
	Slightly Disagree	2 (1.0)	1 (1.3)	1 (1.8)	0
	Strongly Disagree	0	0	0	0
Computers are useful only for several subject areas.	Strongly Agree	12 (6.6)	6 (8.0)	3 (5.5)	3 (5.8)
	Slightly Agree	54 (29.7)	24 (32.0)	15 (27.3)	15 (28.8)
	Slightly Disagree	20 (11.0)	7 (49.3)	7 (12.7)	6 (11.6)
	Strongly Disagree	96 (52.7)	38 (50.7)	30 (54.5)	28 (53.8)
I want to take computer training courses to learn about computers more.	Strongly Agree	124 (68.1)	56 (74.7)	31 (56.4)	37 (71.2)
	Slightly Agree	44 (24.2)	17 (22.7)	16 (29.1)	11 (21.2)
	Slightly Disagree	9 (5.0)	1 (1.3)	5 (9.0)	3 (5.8)
	Strongly Disagree	5 (2.7)	1 (1.3)	3 (5.5)	1 (1.8)
Every teacher should learn about computers.	Strongly Agree	140 (77.0)	66 (88.0)	33 (60.0)	41 (78.8)
	Slightly Agree	41 (22.5)	9 (12.0)	21 (38.2)	11 (21.2)
	Slightly Disagree	1 (.5)	0	1 (1.8)	0
	Strongly Disagree	0	0	0	0
Computer related activities may cause inhuman relationship.	Strongly Agree	1 (.5)	1 (1.3)	0	0
	Slightly Agree	103 (56.6)	45 (60.0)	27 (49.1)	31 (59.6)
	Slightly Disagree	37 (20.4)	18 (24.0)	12 (21.8)	7 (13.5)
	Strongly Disagree	41 (22.5)	11 (14.7)	16 (29.1)	14 (26.9)
Computer Education is more important for male students than for female students.	Strongly Agree	4 (2.2)	0	3 (5.5)	1 (1.9)
	Slightly Agree	8 (4.4)	1 (1.3)	6 (10.9)	1 (1.9)
	Slightly Disagree	15 (8.2)	6 (8.0)	5 (9.1)	4 (7.7)
	Strongly Disagree	155 (85.2)	68 (90.7)	41 (74.5)	46 (88.5)
Female students can learn about computers more easily than male students.	Strongly Agree	2 (1.1)	1 (1.3)	1 (1.8)	0
	Slightly Agree	26 (14.3)	11 (14.7)	5 (9.1)	10 (19.2)
	Slightly Disagree	45 (24.7)	15 (20.0)	22 (40.0)	8 (15.4)
	Strongly Disagree	109 (59.9)	48 (64.0)	27 (49.1)	34 (65.4)

About the need for acquiring computer-related experiences, two questions were presented on the need for taking computer-related training courses and learning about computers. Most teachers showed either strong or slight agreement on the issues: more strong agreement was found than slight agreement.

Concerning the influence of computer use on inhuman relationship, one question was raised. Nearly half of the teachers reported slight agreement on the influence of computer use on inhuman relationship. However, the other half of the teachers in the sample showed strong or slight disagreement.

Concerning gender equity, teachers generally viewed computers to be important for both gender groups. They also viewed students to have similar abilities to learn about computers regardless of their gender.

DISCUSSION

Undoubtedly, computers have been playing an important role in education. However, the importance of this role, to a large extent, depends on how educators use computers and how they view the effectiveness of computers. Although a fairly large body of research has been conducted in the United States on school use of computers and educators' attitudes toward computers, there is little information known on this topic in Korea. Because computer use in schools is a new area of education in Korea, it is an important topic that should be systematically explored. Teachers should not blindly accept the technology, but should consider carefully all aspects of the implementation of the technology.

The results of this research have provided valuable information regarding how Korean schools implement computers and how computer-using teachers perceive computers as instructional and administrative tools.

Overall, for instruction, Korean schools do have relatively a large number of hardware (i.e., about 28 computers in average) and a large amount of software(i.e., about 57 pieces in average) due to the strong governmental support. For administration, there has been no governmental support provided to schools. However, most schools have at least one computer to use for administrative purposes. When the data were compared according to the school level, only modest differences were found among elementary, middle and high schools with some exceptional cases. Concerning the results of computer education, computer-using teachers showed relatively positive impression on the results except the increase of teaching load. Also, computer-using teachers' attitudes toward computers tended to be positive.

In contrast with these satisfactory findings, some disappointing results were also found in several important factors. Those results need to be examined further in order to get some insights into problems that educators may face in performing computer education, and things to be considered in the development of governmental policy and plan.

First, the kind of computer hardware available in schools seem to cause serious problems in school computer education. Most of computers are IBM or IBM compatable XTs without hard diskdrives. Because the functions of these computers are very limited, the computers cannot perform the activities that teachers want their students to do. Also, with the average of 60

students per class, it is very difficult to handle the whole class with floppy diskettes. On this point, schools need to equip better computers with hard diskdrives.

Second, about the amount of software available in schools, Korean government provides a strong support for the development and distribution of educational software. On the basis of the support, 497 pieces of educational software have been developed by the end of 1994, and schools can make copies of the software for free. However, about 30% of teachers in the sample reported that their schools do not have any software to use. This indicates a serious problem in the way to distribute the software. A more detailed investigation needs to be made on this problem.

Third, Korean government has built a rewarding system to encourage teachers' development of software. However, over 60% of computer-using teachers in this research informed that they know nothing about software development. More attention needs to be given to computer-related training to teach this topic in a more systematic manner.

Fourth, when teachers were asked to point out the most important problem hindering active uses of computers and the most important factor ameliorating the problem, a large proportion of teachers indicated "the lack of qualified teachers" as the most important one. It needs to be examined carefully about whether computer-related training opportunities are provided enough to teachers who are enthusiatic about computer uses.

Fifth, concerning the school policy on computer education, the comparison of present research against the 1989's revealed an unexpected decrease in some policy-related activities (i.e., formation of an interest group, periodic evaluation on computer education, reduction of teaching load and purchase of computer-related materials). Especially, it was noticeable that in more than 96% of schools, the teaching load of computer-using teachers has never been reduced. More careful consideration needs to be provided on the development of school policy, so that computer uses can be activated in schools.

Sixth, careful attention needs to be paid to the way computers are used in schools. Computers can be used not only in computer education classes but also in regular classrooms. Efforts need to be provided to inform teachers of the various ways of implementing computers in teaching.

These findings provide valuable insights into the policy-making. As schools increase their utilization of computers, educational decision-makers need an information base concerning how schools use computers and what attitudes educators have toward computers. Successful uses of computers in schools require the careful development of policy and the implementation of plans. Through thoughtful policy-making and planning along with sufficient resources, schools and teachers can expect positive outcomes of computer use in both instruction and administration. Data collected now at the time of the initial use of computers in Korea will be useful for the Ministry of Education to set up a policy to guide computer education.

In addition, it can be expected that in the near furture, computer education in Korean schools will grow fast. In order to maintain up-to-date information on how schools use computers, longitudinal data will have to be collected. Also, at the beginning stage of governmental promotion to set up policies for computer education in Korean schools, policy analysis studies need to be conducted focusing on cost and efficacy.

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